

AD-A105 253

ARMY AVIATION CENTER FORT RUCKER AL DIRECTORATE OF E--ETC F/G 5/9
FIXED WING MULTI-ENGINE QUALIFICATION COURSE (FWMEQC) EVALUATIO--ETC(U)
JUL 81 J C HAYES, W E MANGUS

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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER DES 81-8	2. GOVT ACCESSION NO. AD-A105253	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Fixed Wing Multi-Engine Qualification Course (FWMEQC) Evaluation		5. TYPE OF REPORT & PERIOD COVERED Final Report
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) MAJ John C. Hayes CPT William E. Mangus		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Directorate of Evaluation and Standardization U. S. Army Aviation Center Fort Rucker, AL 36362		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE July 1981
		13. NUMBER OF PAGES 20
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		15. SECURITY CLASS. (of this report) UNCLASSIFIED
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approval for public release; distribution unlimited.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Instructional Systems Development (ISD), Program of Instruction (POI), Train- ing Objectives (TO), Lesson Plans, Student Handouts, Examinations, Flight Line, Flight Instructors, Academic Instruction, Flight Evaluation, Synthetic Flight Training System (SFTS), Critiques.		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) 1. The Fixed Wing Multi-Engine Qualification Course (FWMEQC) is 10 weeks, 2 days in length. Academic instruction is conducted by the Department of Academic Training. Flight instruction is provided by a civilian contractor under the supervision of the Department of Flight Training. The course was established to train commissioned and warrant officer Army aviators in fixed wing aircraft flight techniques for multi-engine aircraft qualification including the Army Fixed Wing Instrument Rating. (Cont'd on Reverse)		

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2. Evaluation Division of the Directorate of Evaluation and Standardization (DES) was tasked to assess the effectiveness of training in the FWMEQC early in September 1980. The evaluation plan included provisions for investigation of the adequacy of techniques and procedures of instruction. It further included observation of a selected sample of academic and flight training to evaluate instruction, training materials, and training areas. Primary objective of the observations was to determine how well course objectives were being achieved by students.

3. The evaluation produced the following major findings:

a. Instructional systems development procedures and techniques were adequate.

b. The Program of Instruction (POI) has been updated and was forwarded to TRADOC for approval on 30 July 1980.

c. There is a high degree of consistency on training objectives from the POI to lesson plans and student handouts.

d. Training objectives are being satisfactorily achieved.

e. Except for a limited number of test questions, examinations are satisfactory.

f. Evaluation of training through analysis of exam results is not being adequately accomplished in the FWMEQC.

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ACKNOWLEDGEMENT

1. This evaluation was initiated and conducted by the Directorate of Evaluation and Standardization (DES), United States Army Aviation Center, Fort Rucker, Alabama.
2. The evaluation was completed by United States Army Reserve personnel on active duty for training, under the direction of the Commander, Internal Instructional Systems Evaluation Branch.
3. The following personnel conducted the evaluation:

Major John C. Hayes, CE, 114-28-0705, USAR Control Group

Captain William E. Mangus, TC, 236-70-5710, USAR Control Group

ABSTRACT

1. The Fixed Wing Multi-Engine Qualification Course (FWMEQC) is 10 weeks, 2 days in length. Academic instruction is conducted by the Department of Academic Training. Flight instruction is provided by a civilian contractor under the supervision of the Department of Flight Training. The course was established to train commissioned and warrant officer Army aviators in fixed wing aircraft flight techniques for multi-engine aircraft qualification including the Army Fixed Wing Instrument Rating.

2. Evaluation Division of the Directorate of Evaluation and Standardization (DES) was tasked to assess the effectiveness of training in the FWMEQC early in September 1980. The evaluation plan included provisions for investigation of the adequacy of techniques and procedures of instruction. It further included observation of a selected sample of academic and flight training to evaluate instruction, training materials, and training areas. Primary objective of the observations was to determine how well course objectives were being achieved by students.

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a. Instructional systems development procedures and techniques were adequate.

b. The Program of Instruction (POI) has been updated and was forwarded to TRADOC for approval on 30 July 1980.

c. There is a high degree of consistency on training objectives from the POI to lesson plans and student handouts.

d. Training objectives are being satisfactorily achieved.

e. Except for a limited number of test questions, examinations are satisfactory.

f. Evaluation of training through analysis of exam results is not being adequately accomplished in the FWMEQC.

EVALUATION OF THE FIXED WING
MULTI-ENGINE QUALIFICATION COURSE

1. INTRODUCTION:

a. Background. The Fixed Wing Multi-Engine Qualification Course (FWMEQC) was established to train commissioned and warrant officer Army aviators in fixed wing aircraft flight techniques for multi-engine aircraft qualification. Graduates receive the award of an Army Fixed Wing Instrument Rating in accordance with FAA standards and applicable Army regulations. Length of the course in peacetime is 10 weeks, 2 days with a total of 416 hours of instruction. Academic instruction is conducted by the Department of Academic Training and flight instruction is provided by Doss Aeronautical Services, Inc., under the supervision of the Department of Flight Training.

b. Purpose. Since this program of instruction has been in operation for a number of years and has not been formally evaluated, this assessment of its overall effectiveness was initiated.

2. EVALUATION PLAN:

a. Objectives.

(1) Determine whether techniques and procedures applied during the instructional systems development of the FWMFQC were adequate.

(2) Determine by spot-checks of selected samples of academic and flight training if training materials, instruction, and evaluation are effective in accomplishing training objectives.

(3) Determine whether there are any significant problems existing or developing during the training process.

b. Methodology.

(1) Research the instructional systems development process by interviews with personnel who are proponents for each phase of development to determine adequacy of course development.

(2) Compare training objectives in the program of instruction (POI), the lesson plans, and student handouts for consistency.

(3) Observe a selected sample of academic instruction to determine whether training objectives were achieved and whether training facilities are adequate. Include at least one examination in these observations.

(4) Visit the flight line and observe training to determine adequacy of training activities and whether any training problems exist.

(5) Apply the following techniques to determine any significant trends or problems:

(a) Review student critiques.

(b) Interview flight instructors, academic instructors, and students. Research into the techniques and procedures applied by DTD during instructional systems development shows that they were adequate.

(c) Interview standardization instructor pilots in Flight Standardization Division (FSD), DES.

c. Conduct of the Evaluation. The above methodology was executed by the two officers named in page ii under the supervision of the Commander of Internal Instructional Systems Evaluation Branch, Evaluation Division, DES.

3. FINDINGS:

a. Research in the Directorate of Training Development into the techniques and procedures applied during instructional systems development show that they were adequate. An analysis of the existing course, which was developed prior to the School Model 76 requirements, led to the conclusion that the course meets the training needs of the U. S. Army Aviation Center. The research also revealed that the several subcourses in FWMEQC, i.e., Weather Flight Planning, IFR Flight Planning, Aircraft Systems, etc., have been kept up-to-date as needed. Additionally, research proved that the POI has been recently updated and was presented to TRADOC for approval on 30 July 1980. That POI was a major change including new lesson plans, examinations, and some subject matter revisions. TRADOC approved the new POI on 13 November 1980.

b. Comparison of training objectives listed in the POI with those in lesson plans and student handouts shows very good consistency. Lesson plans expand POI learning objectives into their realistic inherent learning elements.

c. Observations of sixteen hours of academic instruction produced the following information which shows that training materials and instruction are effective in accomplishing training objectives.

(1) Classrooms, the learning resource center, and training areas are adequate to support the training mission.

(2) Training aids are operable and well maintained.

(3) Instructor training is adequate and instructor motivation is uniformly high.

(4) Student response during the observations and the demonstration of subject matter expertise by instructors indicate learning objectives are being achieved.

(5) Observation of two examinations, 68-EA2E, Principles of Flight, and 68-EA3C, Weather Flight Planning, led to the following.

(a) Overall results of the two exams for nine classes indicate students are succeeding in the two subject areas. The following table illustrates that success.

Test Number	<u>68-EA-2E</u>	<u>68-EA-3C</u>
Number of Questions	33	40
Number of Scores Checked	107	107
Standard Deviation	6.4	7.1
Average Score	91	89
Time Allowed	1 hour	1 hour

(b) Further investigation of the effectiveness of the two exams through item analysis was undertaken. Only one item analysis for 68-EA-3C could be found. That one was dated January 1980 and included only ten students. Answer sheets for both exams were available in the Department of Academic Training for nine classes (80-1 through 80-9, 107 students). They were obtained by the evaluators and analysis was conducted. Results are shown at Annexes A & B. Review of these results shows that:

1 On 68-EA2E, only one question, number 26, was missed by 30% or more of students.

2 On 68-EA-3C, there are three questions where the percent of misses exceeds 30% (numbers 17, 21 and 29). NOTE: Selection of 30% misses on a test question as a critical point is based upon the traditional use of 70% correct as the passing point.

d. Observation of Training at the flight line produced these results.

(1) Eighty-three EFF1 (contact flight grade) and EFF2 (Instrument flight grade) check rides were reviewed. There were only two unsatisfactory grades given. The two students involved passed their rechecks. Therefore, flight instruction and flight training facilities are judged as adequate. A breakdown of the range of grades for check rides for eighty-three students on EFF1 and EFF2 is shown at Annex C.

(2) For each check ride (EFF1 and EFF2), the number of downgrades (C and U) on each flight task were counted. The results are shown at Annex C. The largest number of downgrades given for any flight task was six for EFF1 and five for EFF2. This is further indication that flight training does include detailed evaluation of students on all flight tasks and that flight training is adequate.

(3) Observations of flight simulator training shows it to be outstanding. Review of critique sheets by students for simulator training showed they felt instructors were superior. The only adverse comment on this training concerned the availability and maintenance of the GAT-2. Investigation of this comment with the branch chief and with maintenance personnel showed that down time for the trainers has presented no handicap to training. There are two trainers available and maintenance records show that no overtime pay has been necessary for keeping at least one of them operable at all times.

(4) Performance data on each student and flight instructor is being maintained by the Department of Flight Training. However, no formal reports are being made to document the performance of each class nor to show a profile of instructor strengths or weaknesses. The reason given for not making such reports was that student load does not justify the expense required.

e. Interviews with flight and academic instructors and review of student critiques did not indicate the existence of any significant training problems or any trends toward problems. There were some comments which show how instructors perceive factors that do have some impact on training. They included the following:

(1) Flight instructors were consistent in the contention that students are not fully versed in the basic fundamentals of fixed wing flight and that the training program is not adequately preparing the student for fixed wing aviator assignments. NOTE: This comment is not supported by the grades given by the flight instructors.

(2) Instructors are concerned with the age and condition of the T-42 aircraft. While availability is very high, near 80%, these aircraft have an average of 12,441.6 airframe hours, all in a training environment. A breakdown of aircraft airframe hours is shown at Annex E.

4. CONCLUSIONS:

a. Procedures applied during the instructional systems development of the FWMEQC were adequate.

b. The POI has been updated and was submitted to TRADOC for approval on 30 July 1980. It was approved on 13 November 1980.

c. There is a high degree of consistency on training objectives from the POI to lesson plans and student handouts.

d. Training objectives in the classroom and on the flight line are being achieved satisfactorily.

e. Except for a limited number of test questions, examinations are satisfactory.

f. Evaluation of training through analysis of exam results, as required by USAAVNC Reg 350-14, is not being adequately accomplished in the FWMEQC.

ANNEX A

EVALUATION OF INCORRECT RESPONSES EXAM 68-EA-2E, PRINCIPLES OF FLIGHT
(number of answer sheets - 107)

ITEM #	NUMBER OF INCORRECT RESPONSES									TOTAL #	TOTAL %
	80-1	80-2	80-3	80-4	80-5	80-6	80-7	80-8	80-9		
1	1	1	2	1		1	2	3		11	10
2	1	2		2			3			8	7
3										0	0
4	1	1		1	3	4	2		1	13	12
5	1		1	1	2		3	1		9	8
6				1			1			2	2
7		1			2					3	3
8									1	1	1
9	1	1	3	8	3	3	7	1	1	28	26
10				1		1				2	2
11	1	1	2	2	2	2	2	3	1	16	15
12	2				2					4	4
13						1	1			2	2
14		2		3	2	2	2	3	2	16	15
15	2	1	1	6	1	2	3	3	1	20	19
16	1	1	2	6	1	2	3	2	1	19	18
17				1	1					2	2
18										0	0
19		1		1			1		1	4	4
20	1	3	1	2	3	1				12	11
21								2		2	2
22	1	2	1	5	2	1	1	6	2	21	20

ANNEX A

ITEM #	NUMBER OF INCORRECT RESPONSES									TOTAL #	TOTAL %
	80-1	80-2	80-3	80-4	80-5	80-6	80-7	80-8	80-9		
23		2					1	1		3	3
24	4	3	2	4		2	1	2	2	20	19
25	1	1	2	2	1					7	7
26	2	2	5	5	1	7	5	4	3	34	32
27		1		1	3	1				6	6
28	1	2	4	1			1		1	10	9
29	3	7	1			2	4		2	19	18
30	1	1	1		1					4	4
31	2					2	3	4	1	12	4
32	1					1		1		3	3
33	4	2	2						1	9	8
NUMBER OF RESPONSE SHEETS REVIEWED:											
	12	11	12	13	11	12	12	12	12	107	

ANNEX A

EVALUATION OF GRADE RANGE EXAM 68-EA-2A PRINCIPLE OF FLIGHT

SCORE	80-1	80-2	80-3	80-4	80-5	80-6	80-7	80-8	80-9	TOTAL
100	2	2	2	2	3	1	1			13
97	2	1	1	1		2	1	2	5	15
94	3	2	4	1	3	2	3	4	5	27
91	1	1	3	1	2	4		2	2	16
88	2		1		2	2	2	2		11
85		2		2			2			6
82	1	2		4	1		2	2		12
79	1	1		2			1			5
76			1							1
73						1				1
NUMBER OF SCORES REVIEWED:										
	12	11	12	13	11	12	12	12	12	107
AVERAGE:										
	92	90	93	88	93	91	89	91	95	91

ANNEX B

EVALUATION OF INCORRECT RESPONSES, EXAM 68-EA-3C, WEATHER FLIGHT PLANNING
(number of answer sheets - 107)

NUMBER OF INCORRECT RESPONSES											
ITEM #	80-1	80-2	80-3	80-4	80-5	80-6	80-7	80-8	80-9	TOTAL #	TOTAL %
1	2	1	2	1		4	1	3	2	16	15
2	1			2	4	1	2	1		11	10
3		1			1	2	1			5	5
4										0	0
5		1					1			2	2
6		1		2	2	2	1			8	7
7										0	0
8			3	1		1				5	5
9		2	2	3	1	1	2	1	1	13	12
10	1	5	1	3		3	3	1	3	20	19
11		1								1	1
12	1		4	1		2		2	2	12	11
13	2	2	1	1	1	2	3	2	1	15	14
14	2		3	4	3	6	2	6	2	28	26
15		4							1	5	5
16										0	0
17	4	5	5	8	6	6	5	7	2	48	49
18	4	2	3		1	1	4	4		19	18
19		1		2			1			4	4
20										0	0
21	3	6	1	8	1	4	6	4	4	37	35
22	2	2	2	4	4	2	5	3	2	26	24
23	1			2	1		1	1	1	7	7

ANNEX B

NUMBER OF INCORRECT RESPONSES

ITEM #	80-1	80-2	80-3	80-4	80-5	80-6	80-7	80-8	80-9	TOTAL #	TOTAL %
24						1	1	1		3	3
25	4	1	5	3	2	1	3	5	4	28	26
26		2	1		1	2	4		2	12	11
27	4	1	3	2	3	1	2	4	3	23	21
28	1	6	5	4	1	2	2	2	2	25	23
29	5	4	4	8	3	1	6	4	1	36	34
30				3			2		1	6	6
31				1			1			2	2
32	1	1	1	3		1	3	1	1	12	11
33	1	2	1	4	1	1	4	1		15	14
34					1	2	3		1	7	7
35	1				1			1		3	3
36	2	2	1	3	5	1	1	2	2	19	18
37						2			1	3	3
38		2		1	1	1		2	1	8	7
39							2			2	2
40	1	1	3		1	4	2	1	2	15	14

ANNEX B

EVALUATION OF GRADE RANGE EXAM 68-EA-3C, WEATHER FLIGHT PLANNING

SCORE	80-1	80-2	80-3	80-4	80-5	80-6	80-7	80-8	80-9	TOTAL
100	1	1			1				1	4
98	2	1	2	1	1	1	2	1	1	12
95			1	1	1		1	4	1	9
93	3	1	3	2	2		1		5	17
90	1	2	1	1	2	6	2	1	2	18
88		1	1	1	1	1		2		7
85	3	2	2	1	2	4		1		15
83		1		5						6
80	1		1	1			1	3	2	9
78							2			2
75			1				2			3
73	1	1			1		1			4
70		1								1
NUMBER OF SCORES REVIEWED:										
	12	11	12	13	11	12	12	12	12	107
AVERAGE:										
	89	87	89	87	90	89	85	89	92	89

ANNEX C

FLIGHT EVALUATION GRADE RANGE FOR CLASSES 80-1 THROUGH 80-7

GRADE	EFF 1		EFF 2	
	#	%	#	%
95.	1	0.8	9	7.4
94.	3	2.4	0	--
93.	2	1.6	4	3.3
92.	12	9.9	12	9.9
91.	6	4.9	1	0.8
90.	11	9.1	9	7.4
89.	4	3.3	6	4.9
88.	13	10.7	12	9.9
87.	13	10.7	5	4.1
86.	2	1.6	6	4.9
85.	3	2.4	13	10.7
84.	2	1.6	1	0.8
83.	3	2.4	0	--
82.	1	0.8	2	1.6
81.	2	1.6	0	--
80.	4	3.3	0	--
79.	1	0.8	1	0.8
78.	0	--	1	0.8
72.	0	--	1	0.8
AVERAGE:		88.2		87.7

ANNEX D

SUMMARY OF DOWNGRADES FOR FWMEQC CHECKRIDES

<u>MANEUVERS</u>	<u>EFF 1 # OF STUDENTS DOWNGRADES</u>	<u>EFF 2 # OF STUDENTS DOWNGRADES</u>
Use of Checklist	4	
Cockpit Check		1
Equipment Check		1
Normal Takeoff	2	
Shortfield Takeoff	6	
Stall	2	
Steep Turn	5	
Traffic Pattern	4	1
Normal Landing	6	2
Shortfield Landing	6	
Crosswind Landing	1	1
Reverse Thrust/Brakes	2	
Slow Flight	3	
Instrument Takeoff		1
Prop Synchronization	1	
Flight Fundamentals	1	
Emergency		1
Engine-out/Air Start		1
Radio Voice Com		1
Air Traffic Control		1
Cruise Control		1
Enroute Navigation	1	2
S/Eng Procedures	1	1

ANNEX D

<u>MANEUVERS</u>	<u>EFF 1 # OF STUDENTS DOWNGRADES</u>	<u>EFF 2 # OF STUDENTS DOWNGRADES</u>
Orientation		2
Oral Examination	1	
Track Interception		3
Track Following		4
Radio Fix Iden		2
Transition		1
Holding		3
Approach (GCA)		1
Approach (VOR)		5
Approach (NDB)		3
Approach (ILS)		4
Visual Approach		2
Missed Approach		<u>1</u>
TOTAL DOWNGRADES:	<u>47</u>	45

ANNEX E

T-42 AIRCRAFT AIRFRAME HOURS AS OF 12 SEP 80

<u>YEAR</u>	<u>SERIAL #</u>	<u>AIRFRAME HOURS</u>
65	12682	11827.1
65	12687	13083.0
65	12688	12138.5
65	12700	11490.8
65	12724	13273.5
66	04300	13135.3
66	04301	12998.7
66	04305	12825.6
66	04308	12577.1
66	04309	<u>11067.1</u>

TOTAL: 124416.7

AVERAGE: 12441.6

NOTE: Data provided by Mr. Smith, Northrop Aviation.

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